Developing A Novel Continual Learning Strategy To Address The Forgetting Problem For AI Models In Human-In-The-Loop Procedures

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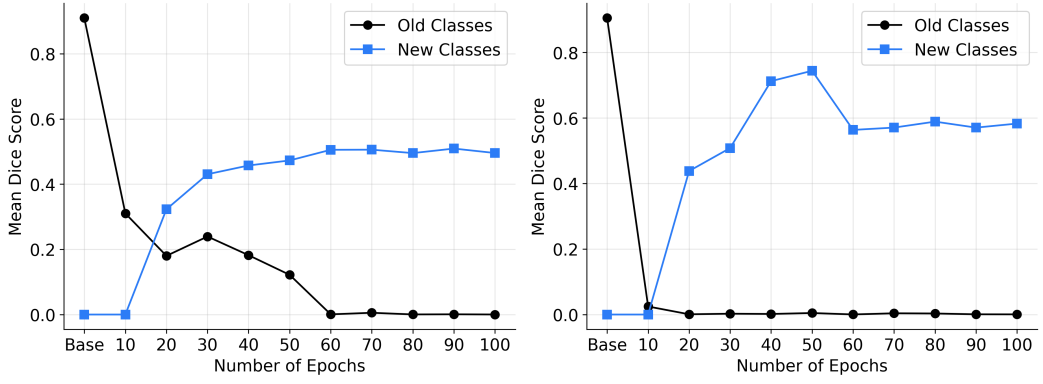
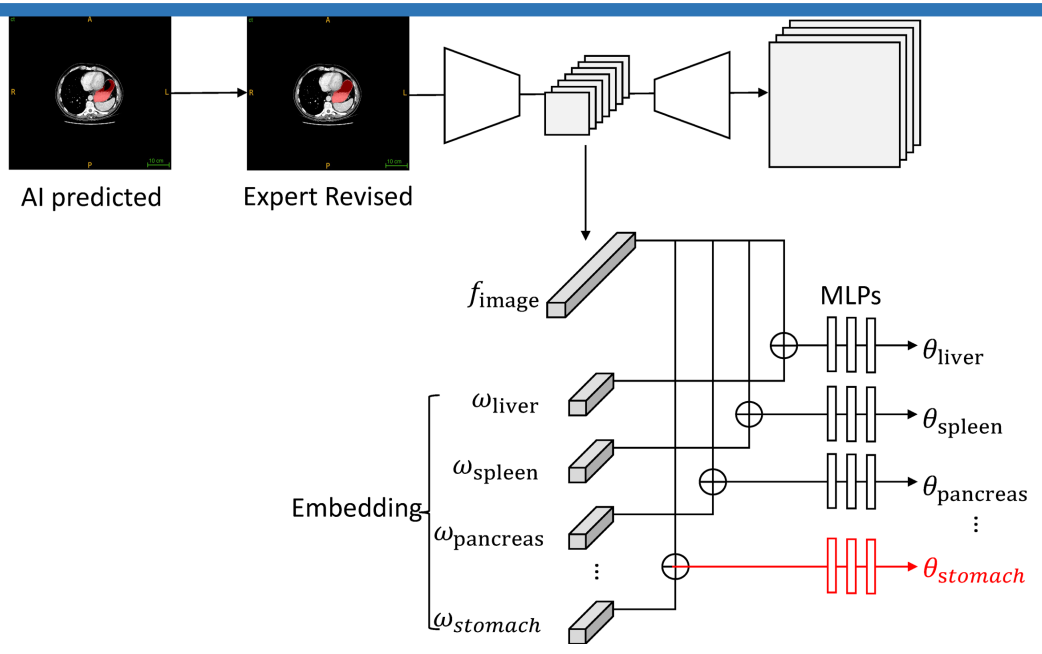
Purpose

Devising an effective strategy to tackle the forgetting problem in AI models that continually learn from newly annotated classes (e.g., organs and tumors) while preserving the knowledge of previously learned classes.





Methods

Methods:

- **" Merged Data Continual Learning "**
- **" Organ-Based MLP layers for AI model "**

Reference

[1] Zhang, Yixiao, et al. "Continual learning for abdominal multi-organ and tumor segmentation." ***International conference on medical image computing and computer-assisted intervention.*** **Cham: Springer Nature Switzerland, 2023.**
[2] Qu, Chongyu, et al. "Annotating 8,000 Abdominal CT Volumes for Multi-Organ Segmentation in Three Weeks." arXiv preprint arXiv:2305.09666 (2023)

Results

	Before Finetuning	Revision-Focused Continual Learning	Merged Data Continue Learning	All Data Continual Learning
Organ	mDice(%)	mDice(%)	mDice(%)	mDice(%)
Spleen	0.94	0.25	0.95	0.94
Right Kidney	0.92	0.08	0.92	0.92
Left Kidney	0.91	0.12	0.91	0.91
Gall Bladder(1)	0.82	0.82	0.82	0.82
Liver	0.96	0.00	0.96	0.96
Stomach(11)	0.93	0.90	0.93	0.93
Aorta(12)	0.73	0.83	0.83	0.75
Postcava(6)	0.76	0.75	0.77	0.77
Pancreas	0.81	0.07	0.82	0.82

(The organs in red were revised by radiologists and the number represents the number of cases radiologists revised)